REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated November 30, 2004. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Information Disclosure Statement

Applicants again respectfully request the Examiner to acknowledge the Information Disclosure Statement (IDS) filed February 7, 2002, in conjunction with the filing of the above-referenced application, and to provide a copy of the acknowledged form PTO-1449 that accompanied the above-noted IDS in due course.

Status of the Claims

Claims 1, 2 and 4-10 are under consideration in this application. Claims 1-2, 4 and 6-9 are being amended, as set forth in the above marked-up presentation of the claim amendments, in order to more particularly define and distinctly claim applicants' invention, and to correct formal errors and/or to better recite or describe the features of the present invention as claimed. All the amendments to the claims are supported by the specification. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Formal Objections

Claims 1, 4, 6 and 7 were objected to for various formal errors. As outlined above, since the claims have been amended according to the Examiner's requirements, Applicants will submit that these objections are rendered moot.

Prior Art Rejections

The Examiner rejected claims 1-3, 5-6 and 8-11 under 35 U.S.C. 103(a) on the grounds of being unpatentable over Girt et al. (US Patent No. 6,645,614) in view of Doerner et al. (US Patent No. 6,537,684). Claim 4 was rejected under 35 U.S.C. 103(a) on the grounds of being unpatentable over Girt '614 and Doerner '684 in view of Wang et al. (US Application No. 2002/0098389). Claim 7 was rejected under 35 U.S.C. 103(a) on the

grounds of being unpatentable over Girt '614 and Doerner '684 in view of Sakawaki et al. (US Application No. 2002/0160234). Applicants strongly but respectfully traverse the above-rejections.

The present invention as recited in claim 1 is directed to a magnetic recording medium comprising: a substrate; an underlayer formed over the substrate; a magnetic recording layer formed directly on the underlayer, having a first magnetic layer, a second magnetic layer and, a non-magnetic intermediate layer formed between the first magnetic layer and the second magnetic layer, wherein the first magnetic layer consisting of Co, Pt, and Cr and formed directly on the underlayer. The non-magnetic intermediate layer formed directly on the first magnetic layer contains at least one element selected from the group consisting of Ru, Ir, and Rh. The second magnetic layer formed on the non-magnetic intermediate layer contains Co as a main component. The first magnetic layer and the second magnetic layer are magnetized in the antiparallel direction in the absence of an applied magnetic field, and the amount of Pt contained in the first magnetic layer is no less than 3 at% and no more than 9 at%. The underlayer is formed to include Cr and Ti.

According to claim 2, the present invention is directed to a magnetic recording medium including a substrate and a magnetic recording layer formed thereon with an underlayer interposed between them. The magnetic recording layer comprises: a first magnetic layer containing Pt formed directly on the underlayer, a second magnetic layer, and a non-magnetic intermediate layer formed between the first magnetic layer and the second magnetic layer. The first magnetic layer and the second magnetic layer are magnetized in the antiparallel direction in the absence of an applied magnetic field, the amount of Pt contained in the first magnetic layer is no less than 3 at % and no more than 9 at %, wherein the magnetic recording layer is formed directly on the underlayer. The underlayer is also formed to include Cr and Ti. The non-magnetic intermediate layer is formed directly on the first magnetic layer, and the second magnetic layer is formed directly on said non-magnetic intermediate layer.

According to claim 8, the present invention is directed to a magnetic storage which comprises a magnetic recording medium, a drive unit to turn the magnetic recording medium, a magnetic head consisting of a writing part and a reading part, a means to move the magnetic head relative to the magnetic recording medium, and a signal processing unit to send and receive signals to and from the magnetic head, wherein the reading part of the magnetic head is a giant magneto-resistive effect element or has a tunnel junction which produces the magneto-resistive effect. The magnetic recording medium is comprised of: a

substrate; an underlayer formed over the substrate; and a magnetic recording layer formed directly on the underlayer, having a first magnetic layer, a second magnetic layer and, a non-magnetic intermediate layer formed between the first magnetic layer and the second magnetic layer, wherein the first magnetic layer consisting of Co, Pt, and Cr and being formed directly on the underlayer. The non-magnetic intermediate layer formed directly on the first magnetic layer contains at least one element selected from the group consisting of Ru, Ir, and Rh. The second magnetic layer formed directly on the non-magnetic intermediate layer contains Co as a main component. The first magnetic layer and the second magnetic layer are magnetized in the antiparallel direction in the absence of an applied magnetic field, and the amount of Pt contained in the first magnetic layer is no less than 3 at % and no more than 9 at %. The underlayer is formed to include Cr and Ti.

Finally, according to claim 9, the present invention is directed to a magnetic storage which comprises a magnetic recording medium, a drive unit to turn the magnetic recording medium, a magnetic head consisting of a writing part and a reading part, a means to move the magnetic head relative to the magnetic recording medium, and a signal processing unit to send and receive signals to and from the magnetic head, wherein the reading part of the magnetic head is a giant magneto-resistive effect element or has a tunnel junction which produces the magneto-resistive effect. The magnetic recording medium is comprised of a substrate and a magnetic recording layer formed thereon with an underlayer interposed between them, wherein the magnetic recording layer incorporates a first magnetic layer containing Pt formed directly on the underlayer, a second magnetic layer, and a non-magnetic intermediate layer formed between the first magnetic layer and the second magnetic layer. The first magnetic layer and the second magnetic layer are magnetized in the antiparallel direction in the absence of an applied magnetic field, the amount of Pt contained in the first magnetic layer is no less than 3 at % and no more than 9 at %, wherein the magnetic recording layer is formed directly on the underlayer. The underlayer is formed to include Cr and Ti. The non-magnetic intermediate layer is formed directly on the first magnetic layer, and the second magnetic layer is formed directly on said non-magnetic intermediate layer.

Applicants respectfully contend that none of the cited references teaches or suggests each and every feature of the present invention as now claimed.

Contrary to the Examiner's assertion in the Office Action, Girt '614 shows that CoCrPt alloy is used as a magnetic layer whose Pt content is varied only at 0 or 10 at% to increase anti-ferromagnetic exchange coupling between two magnetic layers. The main feature of Girt '614 is insertion of "interface layer" between recording layer and non-magnetic spacer to enhance anti-ferromagnetic exchange coupling. The CoCrPt alloy with 0

or 10 at% Pt content is used for the "interface layer" (which is written as "CoCrPt/Ru/CoCrPt" at col. 2, line 66 - col. 3, line 6), not for the recording layer. Girt '614 further describes that Co alloy which contains at least one of Pt, Cr, B, Fe, Ta, Ni, Mo, V, Nb, Ge is used for the recording layer. This means the recording layer is not limited in its composition. However, if Girt can use CoCrPt alloy 0 or 10 at% Pt content as the recording layer, the "interface layer" is no longer necessary

Applicants would submit that Girt '614 incorporates the "interface layer" to avoid using CoCrPt alloy with 0 or 10 at% Pt content as the recording layer. On this point alone, Applicants will contend that the present invention as claimed is significantly different from Girt '614.

Even more, Girt '614 specifically states at col. 2, line 66 - col. 3, line 6, that the content of Pt is only either 0 or 10 (i.e., y = 0 and 10), not any value in between 0 and 10. This is clearly illustrated in Fig. 3, which only shows saturation fields at values of 0 and 10 only. Girt '614 is otherwise silent as to the content of Pt. Thus, Applicants will submit that Girt '64 teaches at most that the greatest level of anti-ferromagnetic coupling is achieved by adjusting the thickness of the Ru spacer layer in conjunction with either 0 Pt content or with a significantly high Pt content (i.e., y =10). In other words, Girt' 614 teaches that varying the Ru spacer layer, not the Pt content is significant in maximizing anti-ferromagnetic coupling.

In contrast, the present invention does show and is characterized by Pt content of 3 – 9 at%, wherein there is a significant difference in the signal-to-noise ratio Slf/Nd at that range, as compared to either 0 or 10 at% Pt, as illustrated in Fig. 11 of the present application. Applicants will submit that had Girt '614 does not show or suggest any characteristics in the range of 0 –10 at% Pt.

Consequently, Girt '614 can neither anticipate nor render obvious each and every feature of the present invention as claimed.

With Girt '614 being deficient in showing all the features of the claimed invention, none of the other references which are only cited as secondary references to show very specific features provide any teaching or suggestion to make up for those deficiencies. As such, those same secondary references cannot be used to sustain any rejection such that any of the features of the present invention as now claimed can be rendered obvious by those references, either individually or in combination.

Applicants will contend that the present invention is thus as a whole distinguishable and thereby allowable. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

Conclusion

In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejections in the Office Action rely, Applicant respectfully contends that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

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